



U.S. Department of Energy
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Federal Energy Management Program

Load Curtailment Strategies and Customer Experiences

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Workshop: Demand Response in Downtown DC

Washington DC

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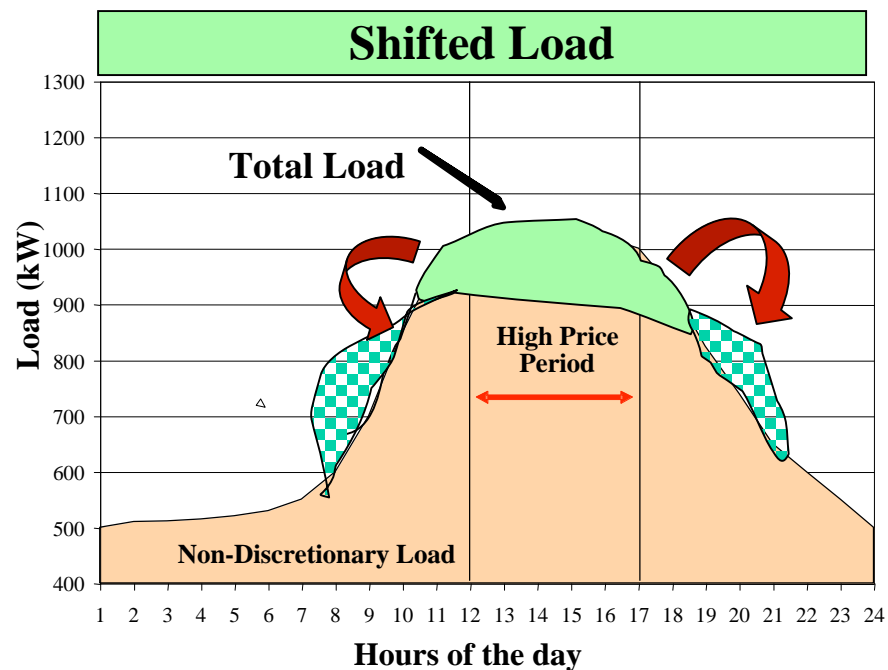
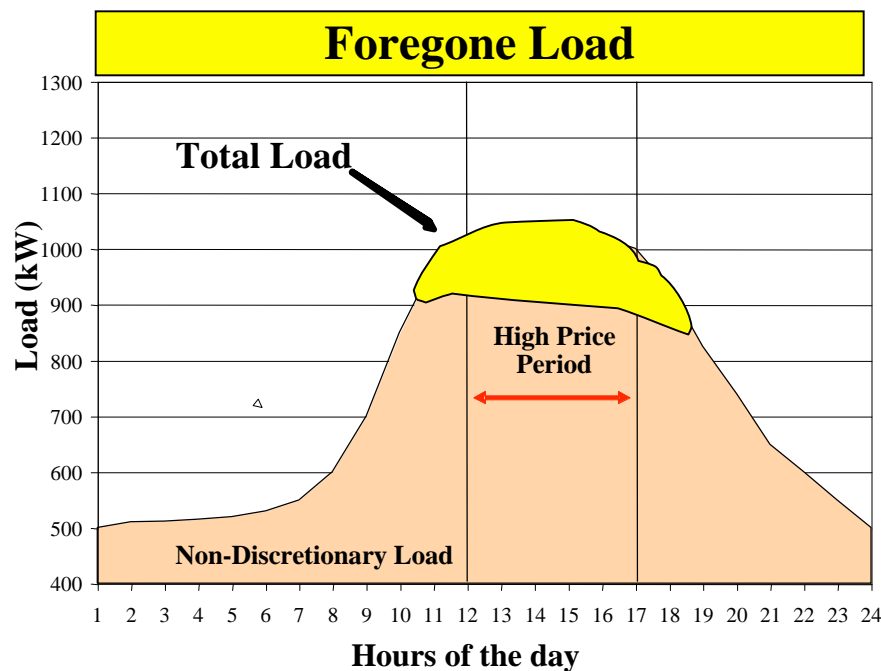


Overview

- Customer Load Curtailment
 - Strategies
 - Assessing Capability
- Customer Response and Performance in Emergency DR programs



Customer Response Strategies: Forego Usage vs. Load Shift



Customers' assess their DR potential: discretionary vs. non-discretionary usage

- Some customers shift load from the peak, and make it up off-peak
- Some customer's maximum load curtailment is often limited to discretionary loads; unwilling to curtail more even if prices rise



Back-up Generation in DC

- Most downtown DC federal facilities have generators, but:
 - mostly diesel-fueled and do not have NO_x control (air quality issues)
 - usually not connected in parallel with grid
 - may be connected to emergency loads that are not fully turned on during day (so operating them doesn't fully "curtail" load)
- Consequently, they often need modifications to become valuable DR resources



What's needed to let Back-up generator participate as DR assets?

- Either connection in parallel with grid or to a load that consistently operates during high-demand periods (e.g., a chiller)
 - Parallel connection + electronics to allow bldg. control system to operate generator: ~ \$50K+
 - Connection with curtailable load is cheaper ($< \frac{1}{2}$)
- Expanded permitting – to allow the operation for the number of hours desired for DR
 - this will often require selective catalytic reduction (SCR) to decrease NO_x emissions

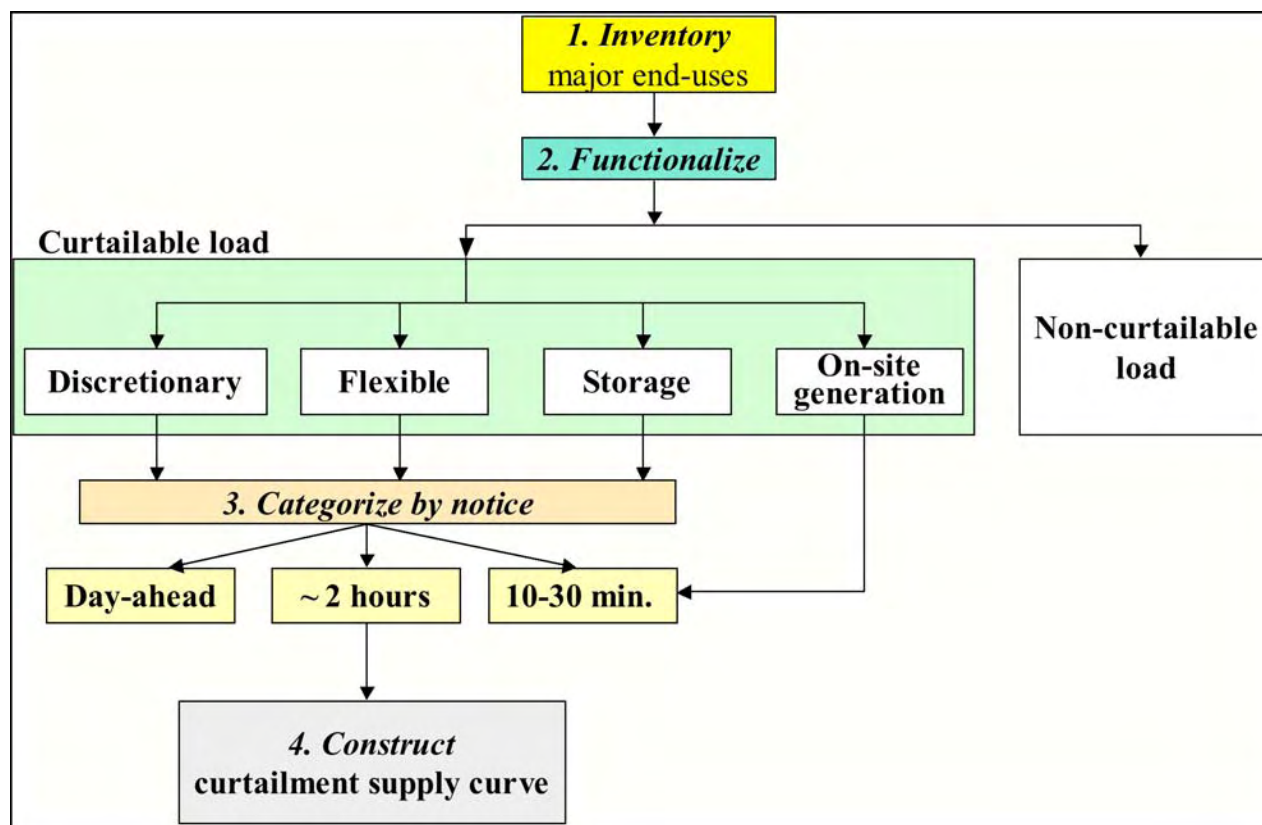


DC Air Quality Permitting

- Dept. of Consumer & Regulatory Affairs / Env. Health Administration / Air Quality Division: 202-535-2250
- Basics: Diesel generators without NO_x reduction technology can be used for emergency DR programs but not economic ones
- The least expensive and most reliable method for cutting NO_x emissions is SCR
 - Adding SCR is not cheap: e.g., ~ \$75K+ for 500kW generator
- Before acting, consider: Cost to run generator at today's diesel (# 2 oil) prices: \$0.15 - \$0.20/kWh



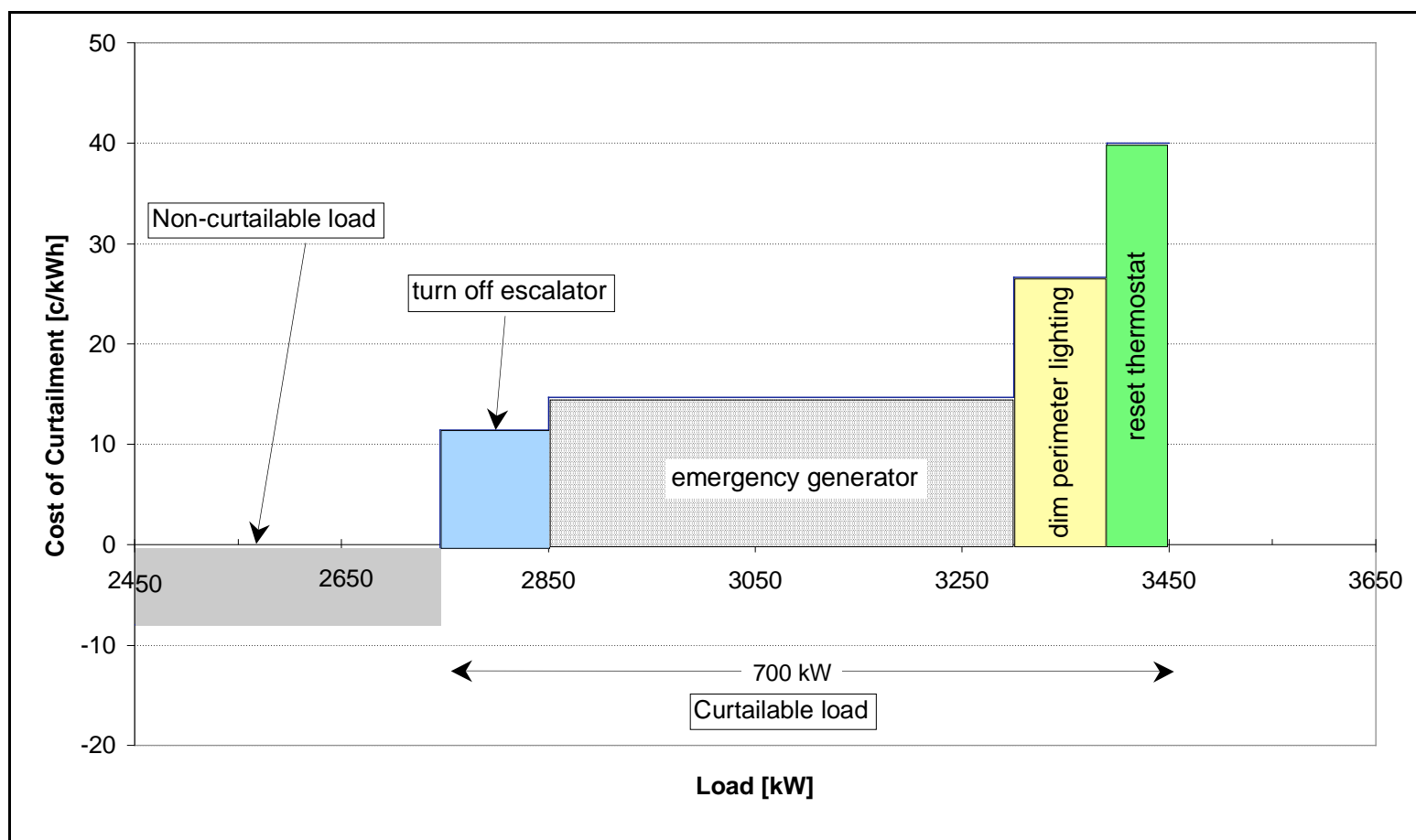
Assessing Load Curtailment Capability



- Process to assess load curtailment capability and opportunities to participate in ISO DR programs

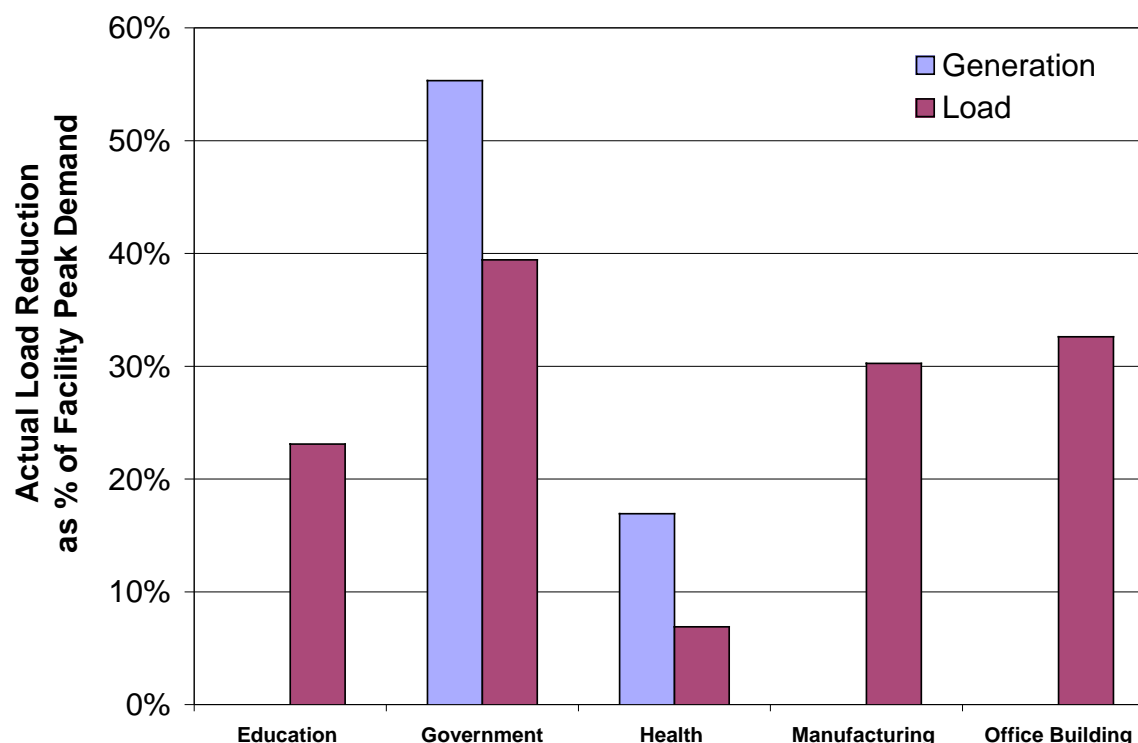


Load Curtailment Supply Curve: An Example





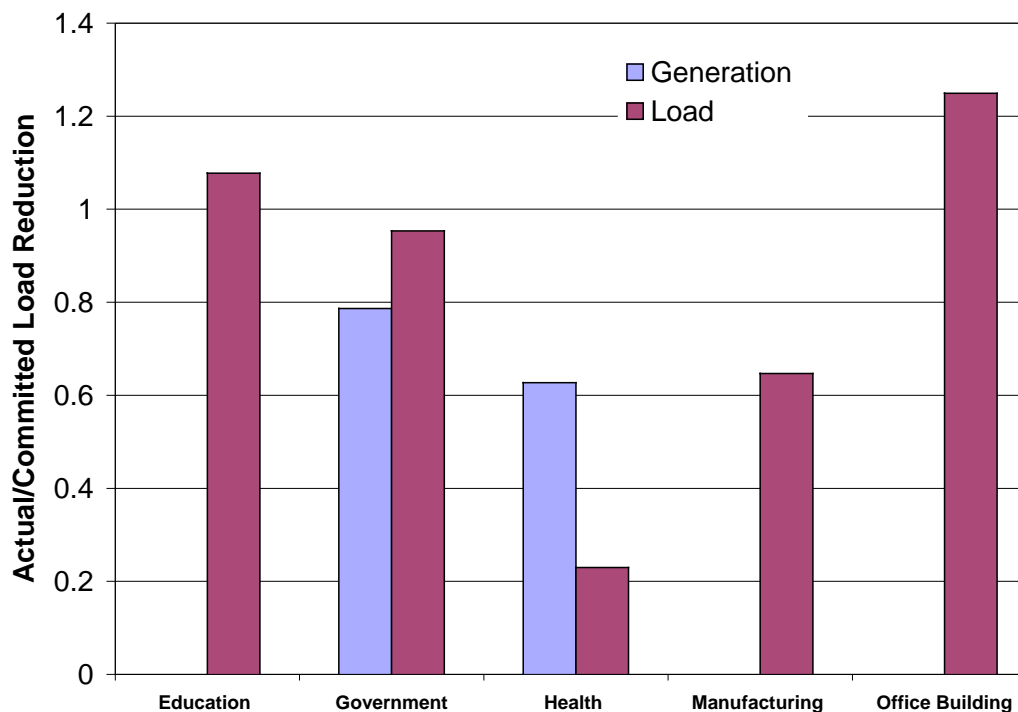
Load Curtailment Potential in NYISO Emergency DR Program



- Customers in NY reduced their load by 20-30% on average, compared to peak demand
- Higher DR potential for customers with onsite generation



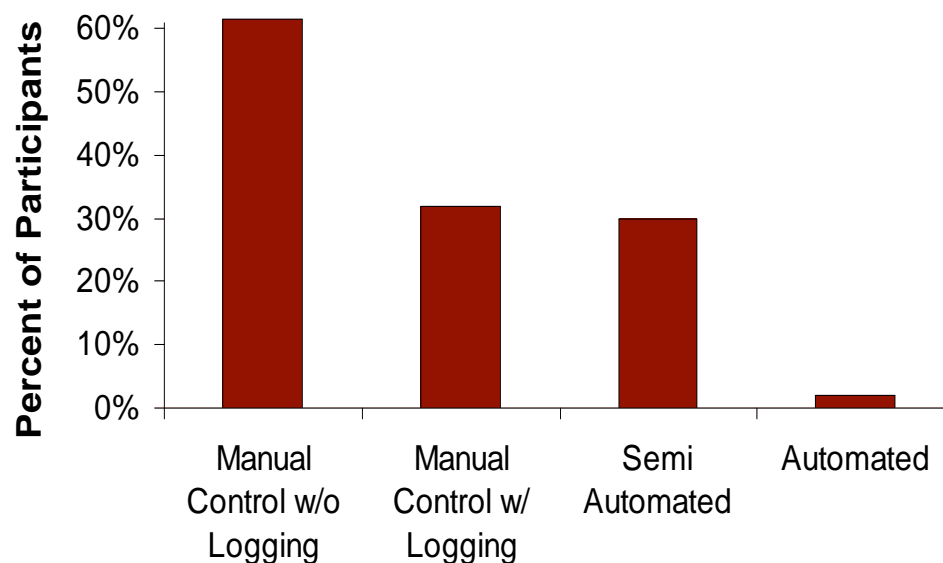
Actual vs. Committed Load Curtailment: NYISO DR Program



- Average ratio of actual to committed load:
 - Load reduction only = 66%
 - Back-up Generation only = 65 to 80%



Few Customers Utilize Automated Load Curtailment Strategies



- 60% of NYISO customers relied on manual approaches during load curtailments
- Most manual control without logging, suggesting no integration into O&M procedures
- Semi-automated LR more prevalent at larger facilities (>1 MW)